4.1.4 Practice: Modeling: Leaning Towers Practice Name: Isaiah Singh Date 4/27/2020

ALS Geometry *Points Possible:*20

YOUR ASSIGNMENT:

Your Tower

There are leaning towers all over the world. These towers are referred to as leaning because they do not stand perpendicular to the ground. Some are built that way, and others have simply started to tilt over the centuries. Use what you know about triangles and trigonometry to help find the keys you have accidentally dropped from a leaning tower.

Drawing the Tower

1. Which of the towers did you select? Draw a sketch of your tower. The height you are given is the vertical distance from the top of the tower to the ground. Label this and the angle the tower makes with the ground on your sketch. (**3 points:** 1 point for selection, 2 points for the sketch)
Name of tower: **Answer: Leaning Tower of Pisa**

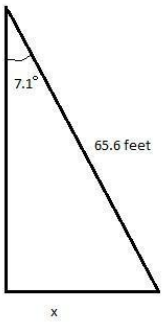
Answer: **I really can't construct a tower in this program.**

Sketch: Sketch your tower below, including the height and angle measurements provided.

Finding the Keys

2. Your keys drop from the top of the tower and fall straight to the ground. You want to know how far from the base of the tower the keys landed. Draw a right triangle that will help you solve the problem. Label each triangle with the information you know. (**1 point**)

Answer:The keys landed 8.11 feet from the base of the tower.



3. Using the known angle, what side is known? What side is unknown? Use *opposite*, *adjacent*, or *hypotenuse* in your answer. (**2 points**)
Known side: _____ **Answer: hypotenuse**
Unknown side: _____ **Answer: Adjacent**

4. What trigonometric ratio would you use to find the distance from the base of the tower to your keys? Identify your choice, and then calculate the distance. (**4 points:** 1 point for the ratio, 2 points for shown work, 1 point for the answer)
Trigonometric ratio (name): _____

Answer: **The trigonometric ratio that I would use to find the distance from the base of the tower to the keys is the tangent; tan (86°) = height / distance.**

Calculation (Show your work):

You can draw a right triangle with angle 86°, opposite leg equal to the height (50 meter) and adjacent leg equal to the distance from the base of the tower to the keys: tan (86°) = 50 m / x

=> x = 50 m / tan(86°)

x = 50 m / 14.30 = 0.98 m

Answer: 0.98 m

5. While you're at the top of the tower, you see an ant walking along the edge of the building. If the ant were to walk straight down the side of the tower until it reached the ground, how far would the ant travel? Which trigonometric ratio would you use to find this distance? Use the ratio to find the measurement. (**4 points:** 1 point for the method, 2 points for shown work, 1 point for the answer)

The hypothenuse is 50 m

The ant is travelling Down the tower,

The vertical is 50 m

Therefore

Cos 86= 50m/x

X= 50msec(86)

6. Confirm that your answer to question 5 is correct using the Pythagorean Theorem instead of trig ratios. (**3 points**)

Answer: $50^2 + 86^2 + c = 99.48$.

The Leaning Tower of Niles

7. The Leaning Tower of Niles, in Illinois, is a replica of the famous Leaning Tower of Pisa. It was completed in 1934. The Tower of Niles is 94 feet high and makes an angle of 85.5° from the ground to the top of the tower. If you drop your keys from the top of this tower, how far from the base of the tower would they land? (**3 points**)

Answer:

Tana=94/7.4

a=arctan(94/7.4)

a=85.5 (to the nearest hundredth of a degree)

By Pythagorean Theorem...

d=(94^2+7.4^2)^(1/2)

d=94.29 ft